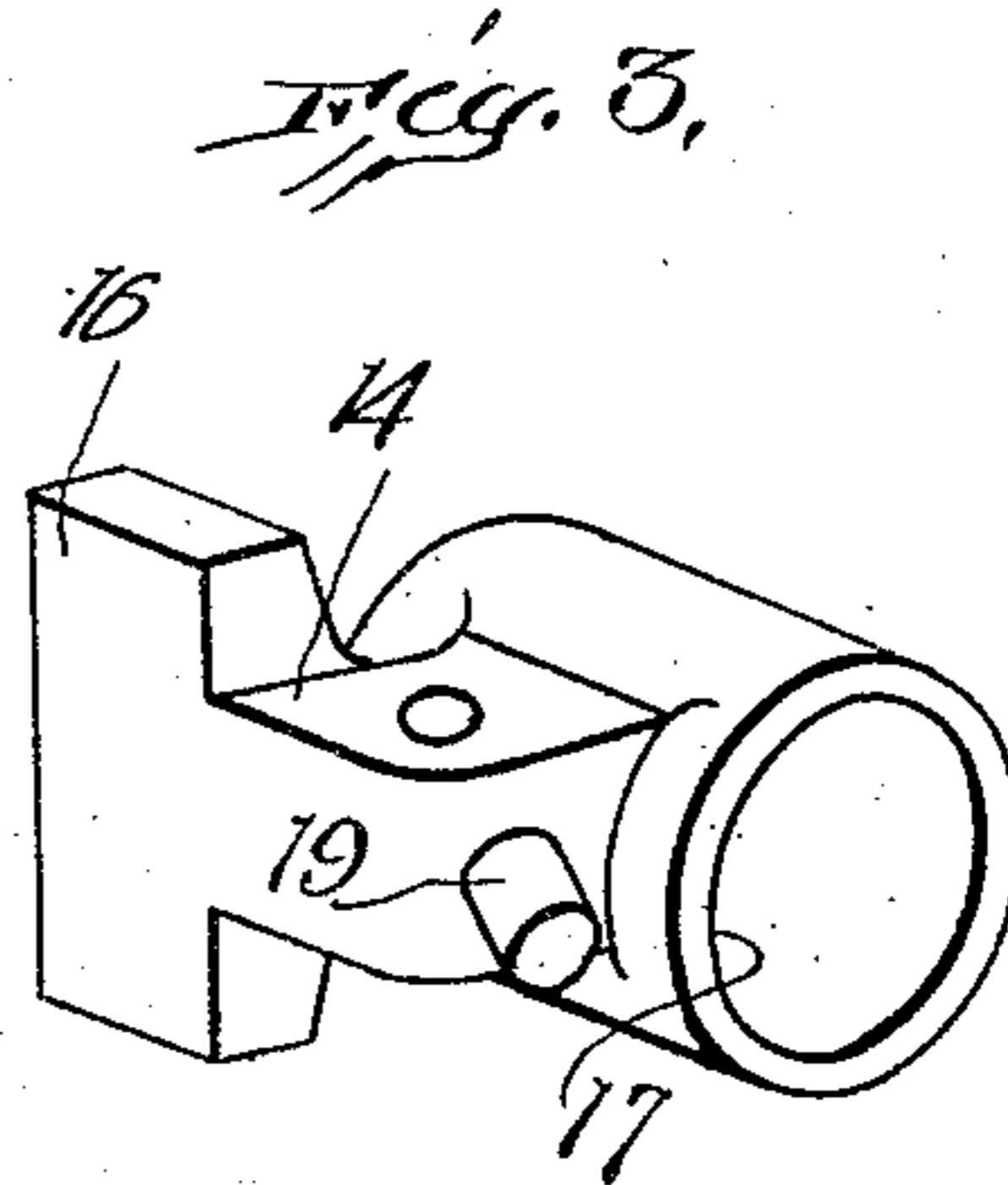
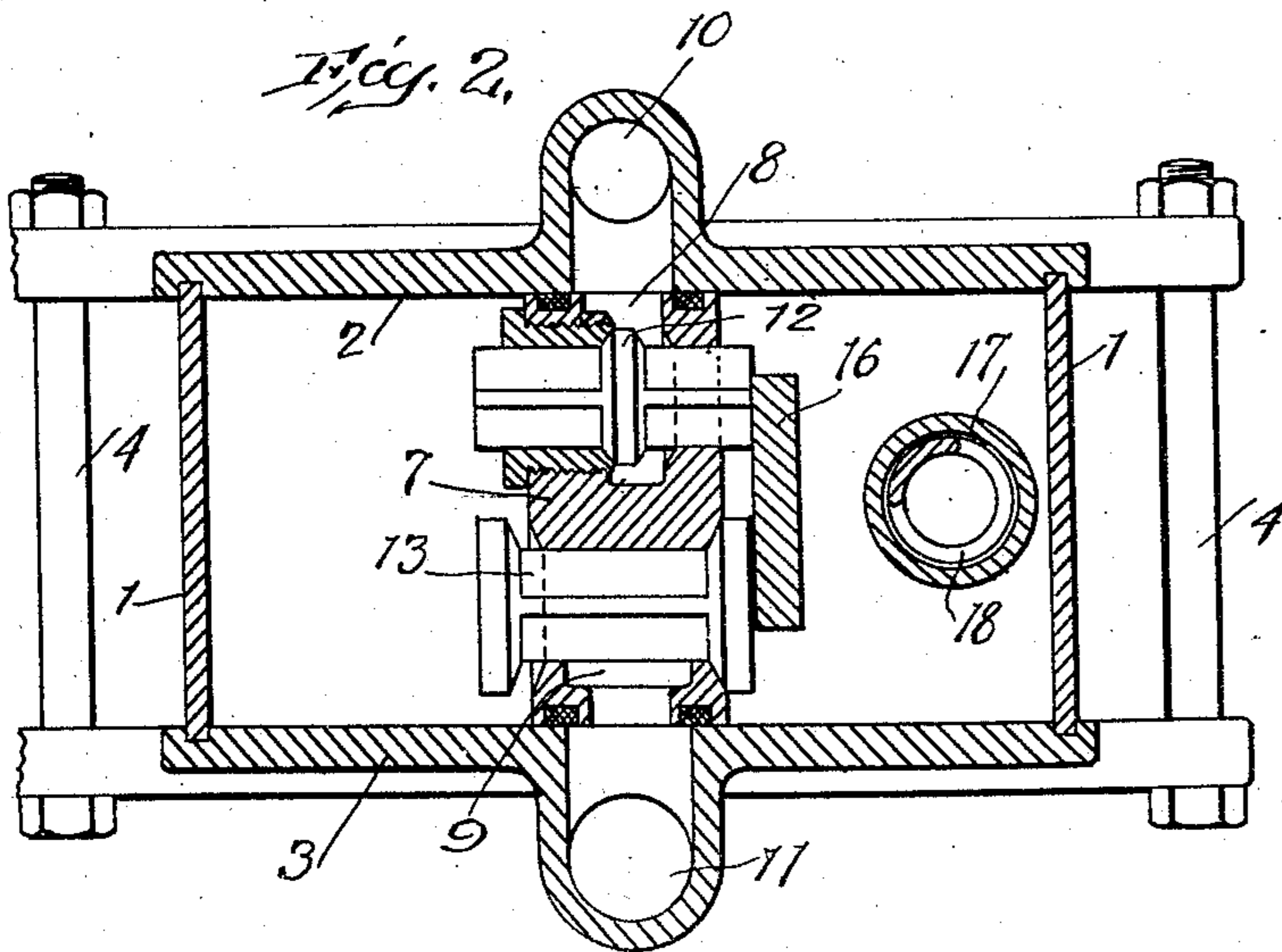
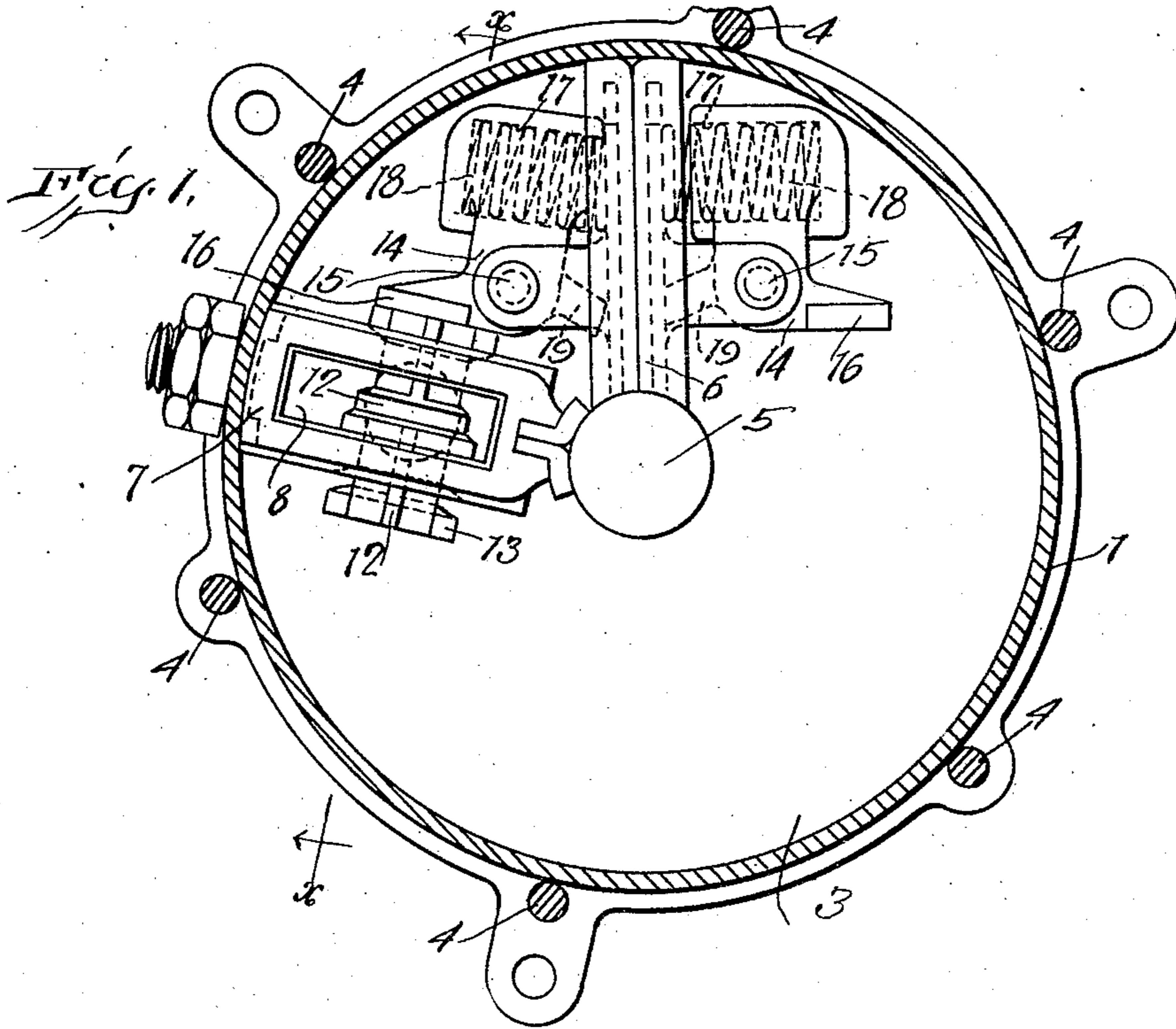


J. E. YOST.
MOTOR.

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994,231.

Patented June 6, 1911.



Witnesses

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MOTOR.

994,231.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEPH E. YOST, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Motors, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to motors and more particularly to valve operating mechanism for water motors.

The object of the invention is to provide a spring-actuated device for shifting the valves which will permit the spring to be so mounted and arranged as to materially lengthen its life, and, to this end, it is a further object of the invention to so support the spring that its full length will be utilized and that it will be compressed without being subjected to lateral twist.

15 It is also an object of the invention to provide such a device with a rigid member which will simultaneously actuate both valves.

A further object of the invention is to provide a valve operating mechanism of this character of a very simple construction which can be cheaply manufactured and which will be strong and durable.

20 In the accompanying drawings, Figure 1 is a transverse, sectional view of an oscillating motor taken just inside the upper cylinder head; Fig. 2 is a vertical, sectional view, taken on the line *x x* of Fig. 1 and looking in the direction of the arrows; and Fig. 3 is a detail view of the valve actuating device.

25 In these drawings I have illustrated one embodiment of my invention and have shown the same as applied to an oscillating motor comprising a cylindrical body portion 1 having its ends closed by cylinder heads 2 and 3, respectively and connected one to the other by tie bolts 4. A motor shaft 5 is journaled in the two cylinder heads and has rigidly secured thereto a wing piston 6 of ordinary construction. Rigidly secured to the cylinder 1 and extending between the same and the shaft 5 is a radial abutment 7 provided with an inlet chamber 8 and an exhaust chamber 9, said chambers communicating, respectively, with inlet and exhaust conduits 10 and 11. The inlet and exhaust

chambers 8 and 9 communicate with the interior of the cylinder 1 on the opposite sides of the piston and their ports are controlled by inlet and exhaust valves 12 and 13, respectively. The operation of the motor so far described is that of the ordinary oscillating motor.

60 Mounted on the opposite sides of the piston 6 are spring-actuated valve-shifting devices which, in the present instance, comprise angular devices in the shape of bell crank levers 14 which are pivotally mounted on the respective sides of the piston by loose pins 15. One member or arm of each device is adapted to engage and actuate the two valves, and, to this end, is preferably widened to form a plate, as indicated at 16. The opposite member or arm of the valve is provided with a socket or recess 17 in which is loosely mounted a coiled spring 18 which is confined between the base of the recess and the piston 6. The expansion of this spring tends to move the plate 15 toward the valves. As the piston 6 approaches the abutment the plate 15 of the device on the adjacent side of the piston will engage the adjacent ends of the two valves. The pressure on the valves will offer sufficient resistance to their movement to cause the springs 18 to be more or less compressed. When the tension of the spring becomes greater than the pressure on the valves, the valves will be unseated, thereby relieving the pressure thereon. As soon as the valves are so unseated the spring 18 will expand and move the plate 15 toward the abutment, thereby carrying the valves across their dead centers and causing the same to be reversed. Inasmuch as the spring is loosely mounted in its recess and none of the coils thereof are utilized to secure the same to a lug, as is customary, the entire length of the spring will be utilized in the operation of the device and the action of any one part thereof reduced accordingly. Further, the movement of the socket 17 toward and from the piston is comparatively slight and is at a very slight angle to the face of the piston. Consequently, the spring will not be subjected to a lateral twist or bending action, as is the case where the spring is mounted on the ends of the valves and is engaged by a fixed part carried by the piston. This further reduces the

wear on the spring, and, as a result of the construction described, the life of the spring is greatly increased and the annoyance and delay occasioned by the breaking of the spring is practically eliminated.

Stops 19 are mounted on the valve-actuating devices in a position to engage the face of the piston and limit the movement of the devices about their pivotal centers, thus maintaining the same always in positions to engage the valves.

While I have shown and described one form of the invention it will be understood that this is chosen for the purpose of illustration only and that the invention can be applied to motors of various kinds and is capable of wide modification. Further, it will be obvious that while I have shown the valves as mounted in the abutment of an oscillating motor and the valve-actuating devices carried by the piston, this arrangement is not essential and these positions also can be altered. I, therefore, wish it to be understood that I do not desire to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A motor comprising a cylinder, an abutment mounted therein, and a piston movable relatively to said abutment, valves mounted in one of said parts, a bell crank lever pivotally mounted on the other of said parts, one arm of said lever being arranged to actuate said valves, and a spring interposed between the other arm of said lever and the part on which it is mounted.

2. A motor comprising a cylinder, an abutment mounted within said cylinder, a piston movable relatively to said abutment, valves mounted in said abutment, a bell crank lever pivotally mounted on said piston and having one end arranged to actuate said valve, and a coiled spring interposed

between the other end of said bell crank lever and the face of said piston.

3. A motor comprising a cylinder, an abutment mounted therein, a piston movable relatively to said abutment, valves mounted in said abutment, a bell crank lever pivotally mounted on said piston, one arm of said lever having lateral extensions to engage and actuate said valves and the other arm of said lever having a socket therein, and a coiled spring loosely mounted within said socket and adapted to engage said piston.

4. A motor comprising a fixed part, a piston movable relatively thereto, valves mounted in said fixed part, a bell-crank lever pivotally mounted on the other of said parts and having means to actuate both of said valves, and a coiled spring interposed between the other arm of said bell crank lever and said piston, whereby the movement of said piston will compress said spring and cause said bell crank lever to be moved.

5. A motor comprising a cylinder, an abutment mounted therein, a piston movable relatively to said abutment, valves mounted in one of said members, a bell crank lever pivotally mounted on the other of said members, one arm of said lever being arranged to actuate said valves, and a spring interposed between the other arm of said lever and the member on which it is mounted, the last-mentioned arm having a part near its free end which may engage the member on which said lever is mounted and check the movement of said lever in one direction, said arm also having a part near the pivotal center of said lever to engage said member and check the movement of said lever in the other direction.

In testimony whereof, I affix my signature in presence of two witnesses.

JOSEPH E. YOST.

Witnesses:

J. FRED ANDERSON,
EDWARD S. REED.